gallstones is becoming well established and warrants increasing interest by physicians caring for patients with this common problem.

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Radioimmunoassay

RADIOIMMUNOASSAY (RIA) provides a method to measure directly many substances that could be measured only indirectly or by animal biopsy before its discovery. It has found its greatest application in endocrinology, providing accurate measurements of very small amounts of circulating hormones. The clinical applications are too numerous to mention in this epitome, but a look at the hypothalamus-pituitary-thyroid axis will serve as an example.

Tests by RIA are available for triiodothyronine (T_3) and thyroxine (T_4). T_3 and T_4 values may be influenced by primary function of the thyroid gland, or by changes in the pituitary gland or the hypothalamus. The thyroid stimulating hormone (TSH) is elaborated in the anterior pituitary gland and is influenced by a hormone produced in the hypothalamus, the TSH releasing hormone (TRH). In turn TSH is suppressed by increased levels of T_3 and T_4 in the circulation.

It follows that one would expect to find a low TSH when there is excessive activity of the thyroid gland due to primary disease, that is, Graves' disease or toxic nodule. If the thyroid gland is hypofunctional, such as in Hashamoto's disease, thyroiditis or ablation of the gland by surgery or radioactive iodine, the TSH would be increased.

If the thyroid is hypofunctional because of disease of the pituitary gland, the TSH would be low as well as the T_4 and T_3.

To test the integrity of the anterior pituitary, TSH releasing hormone (TRH) may be given and a TSH level determined. If the TSH responds to the TRH the integrity of the pituitary has been established. Similar applications may be made to assess the function of many of the endocrine glands.

The advantages of RIA are reproducibility, accuracy, specificity, sensitivity, applicability to very small specimens and relative economy of replication. The reproducible results on the same specimen compare more closely than most other methods of assay. This is a tribute to the degree of accuracy possible with this method. The specificity of antibody/antigen reactions makes it possible to carry out the assay in a system containing many and variable amounts of other closely related substances. It is extremely sensitive, having capabilities to determine the presence of some antigens in the order of one trillionth of a gram (picogram) (10^{-12}gm) per milliliter. Because of the minute quantities of serum needed it is especially useful in pediatrics.

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Clonidine—A New Antihypertensive

CLONIDINE (Catapres®, Boehringer Ingelheim), 2-(2,6- dichlorophenylamino)-2- imidazoline hydrochloride, is a hypotensive agent that acts via central adrenergic blocking. Its order of potency is similar to other sympatholytic agents such as methyldopa (Aldomet®). It causes decreased peripheral resistance and decreased cardiac output, and may cause bradycardia. Cardiac response to exercise, however, is unimpaired. The drug also causes decreased sodium and chloride excretion, and must be used with diuretics. Serious toxicity—such as hepatorenal, oto- or marrow toxicity has not been reported. Serious side effects —such as impotence or orthostatic hypotension— are rare. Depression has been reported and tricyclic antidepressants antagonize the effect of clonidine. Common side effects are drowsiness, constipation and dry mouth; these tend to be transient, even in the face of increased doses. Renal blood flow is preserved or increased, and peripheral renin and aldosterone levels may be decreased; therefore, this drug may be particularly useful for those with decreased renal function or with hyperreninism or hyperaldosteronism.

Abrupt withdrawal of the drug can lead to sympathetic crises within 48 hours, manifest by anxiety, palpitations, sweating, headache and hypertension, and requiring treatment with pro-

pranolol and phentolamine. This effect is avoided by tapering the drug over two to four days. Onset of action is within two to four hours and serum half-life is 20 hours. Twice-a-day dosage is recommended. Administration is begun at 0.1 mg twice daily and increased until control is achieved or limiting side effects occur, up to a maximum of 2.4 mg daily. Clonidine should not be administered to unreliable patients, and patients receiving it should carry an extra supply and Medic Alert® or some other identification tag.

A. ROBERT TESSLER, MD

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Talwin Myopathy

TALWIN (Pentazocine®) is a widely used analgesic. It has gained popularity because it was considered to be less addictive than other potent analgesics.

By 1971 at least two articles had appeared in the dermatology literature describing local reactions to Pentazocine injections. More recently, a much more profound and disabling reaction in the muscles termed "fibrous myopathy" was reported from several sources.

Two young men in their 30's were recently admitted, at the same time, to the chronic pain unit at Rancho Los Amigos Hospital. Both were suffering from fibrous myopathy of the deltoid area bilaterally, and this called the author's attention to this entity. Both young men had (A-B) abduction deformities and complained bitterly of their inability to cross the arm in front of them to carry out such functions as washing the opposite axillary fossa. One of the young men reported that his mother had undergone a surgical excision of both deltoid muscles to relieve this deformity which had followed use of Pentazocine over a period of time.

Steiner and co-workers reported a case with generalized abduction deformity of both upper extremities and lower extremities in a 42-year-old man who had persistent myalgia and progressive muscle stiffness. In this man the disability and rigidity progressed even though the injections had been terminated six months before he came under their care.

There are no specific enzyme or laboratory findings in this condition. The skin overlying the muscles may be atrophied and scarred to the fibrous degenerative muscles. Findings on electromyograms may show a mixed pattern or an interference pattern while at full effort. There is no muscle activity at rest as would be the case in other types of myopathy.

Temporary improvement has resulted in our patients by stretching and manipulating the tight upper extremities under general anesthesia. A brief course of prednisone is given at the time to minimize, it is hoped, re-scarring. Whether or not this treatment will give lasting benefit is very much in doubt. Avoidence of prolonged use of injectable Pentazocine seems the only rational approach to prevent this tragic disabling disorder.

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Computers in Family Practice

THE ROLE OF COMPUTERS in medicine generally, and in family practice specifically, has been gathering increased interest in recent years but has remained unclear. An experience base is now developing which can start to answer some of the initial questions concerning its value in medical practice and education.

A group of three family physicians in Damariscotta, Maine, recently reported their experience over three years with direct computer-patient interactions both in military and private practice. In developing their computer program, this group applied four essential criteria: (1) relatively low cost, (2) extensive programing with medically compatible language, (3) terminal constellations which permit direct nonthreatening patient interaction and (4) no technological expertise required by office personnel. A computerized medical record was developed and selected administrative functions and other aids to patient care were incorporated into the computer program where needed and economically feasible. The computer was thereby used for patient histories, patient education, physician education